CLAIMS

What is claimed is:

1. A method for refreshing a developer, the method comprising the steps of:

(a) developing an imaged printing plate precursor with an aqueous, essentially silicate-free developer having a pH greater than about 12, and producing a loaded developer comprising loaded solids,

in which:

the printing plate precursor comprises an imageable layer over a hydrophilic substrate,

the imageable layer comprises a polymeric material,

the polymeric material is either (i) dispersible in an aqueous solution that has a pH of about 12.0 to about 14.0 or (ii) soluble in an aqueous solution that has a pH of about 12.0 to about 14.0 and insoluble in an aqueous solution that has a pH below about 11.0,

the loaded solids comprise the polymeric material, and

the loaded developer has a pH of about 12.0 to about 14.0 and a loaded solids content of about 0.1 wt% to about 10 wt%;

(b) lowering the pH of the loaded developer to below about 11.0 and producing a liquid whose pH is below about 11.0;

(c) separating insoluble material from the liquid produced in step (b) and producing an essentially colorless liquid, in which the insoluble material comprises material dispersed in the developer, a precipitate formed in step (b), or a combination thereof; and

(d) raising the pH of the essentially colorless liquid to about 12.0 to about 14.0 and producing a refreshed developer.

2. The method of claim 1 in which the pH of the aqueous, essentially silicate-free developer is about 12.5 to about 13.7.

3. The method of claim 1 additionally comprising, after step (d), the step of developing imaged printing plate precursors with the refreshed developer.

4. The method of claim 1 in which the insoluble material comprises a precipitate produced in step (b).

5. The method of claim 4 in which the polymeric material is selected from the group consisting of phenolic polymers, carboxylic acid polymers, sulfonamide polymers, and mixtures thereof.

6. The method of claim 5 in which the printing plate precursor is a one-layer element.

7. The method of claim 6 in which the imageable layer comprises a compound that comprises an *o*-diazonaphthoquinone moiety.

8. The method of claim 1 in which the printing plate precursor comprises a photothermal conversion material.

9. The method of claim 8 in which the insoluble material comprises a precipitate produced in step (b).

10. The method of claim 9 in which the polymeric material is selected from the group consisting of phenolic polymers, carboxylic acid polymers, sulfonamide polymers, and mixtures thereof.

11. The method of claim 10 in which the printing plate precursor comprises at least one layer between the imageable layer and the hydrophilic substrate.

12. The method of claim 11 in which the at least one layer comprises the photothermal conversion material.

13. The method of claim 12 in which the imageable layer comprises a dissolution inhibitor.

14. The method of claim 8 additionally comprising, after step (d), the step of developing imaged printing plate precursors with the refreshed developer.

15. The method of claim 14 in which:

the polymeric material is a phenolic polymer;

the printing plate precursor comprises at least one layer between the imageable layer and the hydrophilic substrate; and

the at least one layer comprises the photothermal conversion material.

16. The method of claim 1 in which hydrochloric acid is added to the developer in step (a).

17. The method of claim 1 in which the loaded solids content is about 4 wt% to about 6 wt%.

18. The method of claim 17 in which the pH of the aqueous, essentially silicate-free developer is about 12.5 to about 13.7.

19. The method of claim 18 additionally comprising, after step (d), the step of developing imaged printing plate precursors with the refreshed developer.

20. An apparatus for refreshing loaded developer, the apparatus comprising:

a first tank connected to a source of the loaded developer, the tank comprising a developer level sensor;

a source of acid connected through an acid dispensing valve to the first tank ;

a first controller connected to the valve, the controller adapted to turn the valve on and off on command from the sensor in the first tank;

a fluid/solid separator connected to the first tank through a discharging valve;

a first conduit connected to the fluid solid separator for directing separated fluid from the fluid/solids separator to a pH treatment tank;

a second conduit connected to the fluid solid separator for directing separated solids to a solids receptor;

a source of a basic solution connected through a basic solution dispensing valve connected to the pH treatment tank; and

a second controller connected to the basic solution dispensing valve, the second controller turning the basic solution dispensing valve on and off.

21. The apparatus of claim 20 in which the first tank additionally comprises a pH meter, and in which the first controller is adapted to turn the acid dispensing valve on when the liquid level in the first tank reaches a predetermined level and off when the pH meter indicates a predetermined pH level in the first tank.

22. The apparatus of claim 21 in which the second controller turns the basic solution dispensing valve on for a predetermined period of time.

23. The apparatus of claim 22 further comprising a mixer in the pH treatment tank.

24. The apparatus of claim 23 in which the pH treatment tank additionally comprises a pH sensor and in which the second controller turns the basic solution dispensing valve off at a predetermined pH level in the pH treatment tank.

25. The apparatus of claim 24 in which the source of loaded developer is a developing tank of a developing processor for developing imaged printing plate precursors with an aqueous, essentially silicate-free developer having a pH greater than about 12,and producing a loaded developer comprising loaded solids, in which:

the printing plate precursor comprises an imageable layer over a hydrophilic substrate,

the imageable layer comprises a polymeric material,

the polymeric material is either (a) dispersible in an aqueous solution that has a pH of about 12.0 to about 14.0 or (b) soluble in an aqueous solution that has a pH of about 12.0 to about 14.0 and insoluble in an aqueous solution that has a pH below about 11.0,

the loaded solids comprise the polymeric material, and

the loaded developer has a pH of about 12.0 to about 14.0 and a loaded solids content of about 0.1 wt% to about 10 wt%.